PB85-214096

Superfund Record of Decision (EPA Region 9)
Celtor Chemical Works Site
Hoopa, California, October 1983

(U.S.) Environmental Protection Agency
Washington, DC

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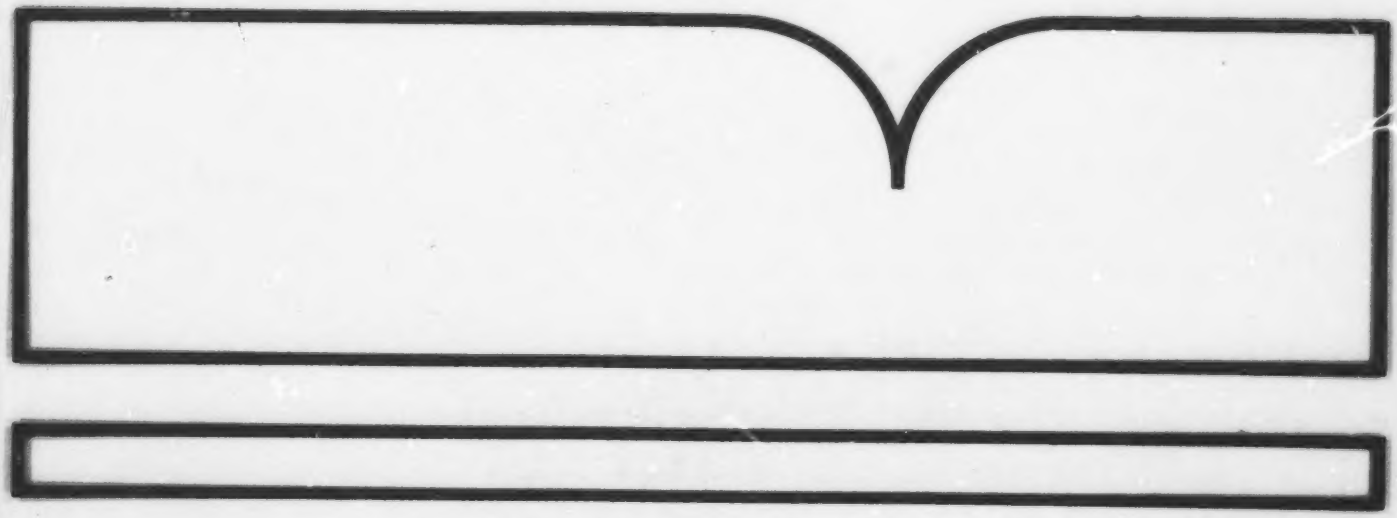

U.S. Department of Commerce
National Technical Information Service
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United States
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Agency

Office of
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EPA/ROD/R09-83/001
October 1983

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EPA

Superfund Record of Decision:

Celtor Chemical Works Site, CA

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15. SUPPLEMENTARY NOTES

16. ABSTRACT

The Celtor Chemical Works site is approximately 2.5 acres located at the north end of the Hoopa Valley Indian Reservation in Humboldt County, CA. The site was operated as a sulfide ore processing plant from 1957 to 1962. The site was abandoned in 1962 following California Department of Fish and Game citations for pollution and fish kills in the nearby Trinity River. The most acute problems at the site are the extremely acidic nature of the runoff and the high concentrations of heavy metals in the soil. The selected initial remedial action for the site includes excavation, transport, and off-site disposal of hazardous substances. Off-site disposal is estimated to cost $340,000.

17. KEY WORDS AND DOCUMENT ANALYSIS

a. DESCRIPTORS	b. IDENTIFIERS/OPEN ENDED TERMS	c. COSATI Field/Group
Record of Decision Celtor Chemical Works Site, CA Contaminated media: gw, sw, soil Key contaminants: heavy metals, ore mining wastes, acidic leachate		

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RECORD OF DECISION

Initial Remedial Measure Alternative Selection

Site: Celtor Chemical Works, Hoopa, California

Documents Reviewed:

I have reviewed the following documents describing the analysis of cost-effectiveness of Initial Remedial Measure alternatives for the Celtor Chemical Works Site:

- Study titled,"Initial Remedial Measure Feasibility Study, Celtor Chemical Works Site, Hoopa, California, August 15, 1983.
- Staff summaries and recommendations, including the Record of Decision Briefing Paper and the Initial Remedial Measure Implementation Alternative Selection.
- Recommendations by the California Department of Health Services.
- Public Participation Responsiveness Summary.

Declarations:

Consistent with the Comprehensive Environmental Response, Compensation and Liability Act of 1980, and the National Oil and Hazardous Substances Contingency Plan, I have determined that the transport and off-site disposal of hazardous substances at an EPA approved landfill effectively mitigates and minimizes damage to, and provides adequate protection of public health, welfare and the environment. I have also determined that the action being taken is appropriate when balanced against the need to use Trust Fund money at other sites. In addition, I have determined that the off-site transport of hazardous substances is more cost-effective than other remedial actions and is necessary to protect public health and welfare and the environment from a potential risk which may be created by further exposure to the continued presence of such substances and, therefore, consistent with Section 101(24) of CERCLA.

Jack McGraw Acty AA

Lee M. Thomas
Assistant Administrator
Office of Solid Waste and Emergency Response

CELTOR CHEMICAL WORKS

Record of Decision Briefing

Purpose of the IRM:

The recommended Initial Remedial Measure is offsite transport and disposal of tailings piles and soil contaminated with heavy metals such as cadmium, copper and zinc. This remedial action is necessary to prevent public contact with the contaminated material and to protect the aquatic environment of the Trinity River.

Background:

* The Celtor Chemical Works site consists of approximately 2.5 acres at the north end of the Hoopa Valley Indian Reservation in Humboldt County, California. The Trinity River is within several hundred feet of the site.

* The Celtor site was operated as a sulfide ore processing plant from 1957 to 1962. The site was abandoned in 1962 following California Department of Fish and Game citations for pollution and fishkills in the Trinity River.

* Contaminated material from the site has washed onto the heavily traveled access road to the Trinity River and it is likely that the contamination runs off into the river during the winter rainy season. The river is an important fishing resource for the Hoopa reservation.

* In July 1981 the site was identified in a California state-wide abandoned industrial waste facility survey. Celtor was included on the proposed (now final) National Priorities List in December 1982.

Remedial Planning Activities to Date:

* In May 1983, a Focused Feasibility Study (FFS) of the site was recommended by EPA Region 9 and the California Department of Health Services (DOHS). This FFS was initiated in June.

* During the FFS, CH2M-Hill reviewed the existing monitoring data on the site and evaluated the potential alternatives to remedy the site. An assessment which weighed the potential public health impacts of the "no action" alternative

was provided by the DOHS in memoranda dated March 10 and August 11, 1983.

* There are three areas of the site, containing an estimated total of 1350 cubic yards of material, which need to be addressed by the IRM:
  - The onsite tailings piles, ore bins and vats contain approximately 865 cubic yards of highly contaminated material (up to 50% heavy metals).
  - The heavily traveled access road adjacent to site. If scraped to a depth of 6 inches along the edges of the site, this road will yield an estimated 100 cubic yards of material. The action will address the road to protect the health of individuals using it.
  - The ditch and field adjacent to the site. These areas have been defoliated due to years of runoff from the site. Assuming that 6 inches of soil is scraped from these areas, another 385 cubic yards of material must be handled.

* The last category of material is somewhat different from the onsite material and the adjacent road in that there is not enough data available on the ditch and the field to establish the transport of pollutants from these areas to the Trinity river or to confirm a imminent threat to the public health or the environment. The few data points we do have suggest that it is reasonable to assume such a transport, however. The costs of the remedial investigation to confirm the threat to the environment, together with the additional costs to the Superfund to handle the ditch and field under a separate remedial action construction contract next year, far exceed the estimated $60,000 to $70,000 cost to include the ditch and field in this IRM. Therefore, it is judged to be more cost effective to include those areas in this action.

* Five alternatives are evaluated in detail in the FFS:
  - Offsite transport and disposal
  - Encapsulation
  - Encapsulation with Neutralization
  - Encapsulation with Solidification
  - Encapsulation with a Concrete Vault

* The Cost Effectiveness Evaluation of these options is presented in Table 1. Although the offsite removal option is not the least expensive option, it is the lowest cost alternative which is technically feasible and reliable and which effectively mitigates and minimizes damage to and provides adequate protection for the public health, welfare and the environment. The recommended cost-effective remedy to limit exposure or threat of exposure to a significant health or environmental hazard is offsite transport and disposal of the tailings piles and contaminated material.

Table 1
COST-EFFECTIVENESS EVALUATION

Effectiveness Measures	Weighting Factor	Offsite Removal	Onsite Encapsulation			
			Liner Only	Liner & Neutralize	Liner & Solidify	Concrete Vault
Level of Cleanup	1.0	5	4	4	4	4.5
Time Required	1.0	5	4.5	4.5	4.5	4
Minimize Community Impact	0.6	5	2	2	2	3
Health, Safety, and Environmental Impacts During Construction	0.7	4	4	4	4	4
Technology Status	0.6	5	4	4	4	4
Acceptability of Land Use Post-Construction	0.4	4.5	2	2	2	3
Risk of Failure	1.1	5	3.5	4	4	4.5
Compatible with Future Remedial Activities	0.9	5	2	2	2	2
Total Weighted Effectiveness Rating		30.6	21.3	21.9	21.9	25.0
Design and Construction Costs	1.0	0.340	0.230	0.265	0.296	0.320
O&M Costs	1.2	0	0.02	0.02	0.02	0.02
Total Weighted Cost		0.340	0.254	0.289	0.320	0.344
Score (Rating/Cost)		90.0	83.9	75.8	68.4	72.7

RDS1/043

Public Review of FFS:

* On August 19, 1983, the FFS was released for public review and comment.

* On August 29, 1983, Region 9 held a public meeting at the Hoopa Valley Business Council Chambers to present the alternatives and receive public comment.

* The public comment period ended on September 6, 1983, after two and one half weeks.

* No adverse comments were received from the public.

Policy Affecting this Site:

* Mining Wastes Policy - The contamination on the site is the result of processing ore to extract metals. The materials to be removed consist primarily of tailings piles and soil contaminated by runoff from the tailings piles. It is current EPA policy to address mining wastes as hazardous substances if they or their components are specifically included as hazardous substances in §101(14) under statutes other than RCRA. This site meets this definition.

* Native American Policy - The Celtor site is located entirely on the Hoopa Valley Indian Reservation. Current EPA policy is that sites located on Native American lands are eligible for remedial funding if the State or the Native Americans provide the assurances required under CERCLA. The State of California has indicated a willingness to enter into a State Superfund Contract to provide those assurances.

Enforcement:

* A notice letter was sent by EPA Region 9 to the Bureau of Indian Affairs as the "owner" of the reservation on August 29, 1983. There has been no response to this notice letter.

* The Celtor Chemical Corporation is a defunct corporation and is unable to contribute to the clean up.

* The Office of Waste Programs Enforcement has recommended implementation of this IRM.

Schedule:

* The site is located in an area which receives 57 inches of rainfall per year, primarily during the winter months. Because runoff from the site is a serious threat to the public health and the environment, implementation of the remedy is scheduled before the end of November.

* The schedule for work calls for the implementation of construction by October 17, 1983. If weather permits, the construction will by complete by November 14, 1983.

INITIAL REMEDIAL MEASURE IMPLEMENTATION

ALTERNATIVE SELECTION

CELTOR CHEMICAL WORKS SITE

HOOPA, CALIFORNIA

I. Background

On August 18, 1983, the San Francisco Regional Office of EPA released the "Initial Remedial Measure Feasibility Study for the CELTOR Chemical Works Site, Hoopa, California" prepared by the consulting firm of CH_2M-Hill. Copies of the report were distributed by CH_2M-Hill to the Hoopa Valley Business Council, California Department of Health Services and other Federal and State Agencies. Copies were also placed in the Bureau of Indian Affairs Hoopa, California office, and in the neighboring town of Willow Creek. In addition, a copy of the study was delivered to the abutting property owner.

Press releases and notices were placed in the local newspapers announcing the availability of the study and announcing that a public meeting would be held on August 29, 1983. The purpose of the meeting was to present the findings of the study and to discuss the remedial options which had been considered. The meeting was also to receive input from the affected community on the recommended alternative and on the selection of the remedial action. A certified shorthand reporter was present and a transcript of the meeting is available through the Regional Office for review.

II. Feasibility Study Alternatives

The purpose of the IRM is to remove the direct exposure to a potential health and environmental hazard, remove highly contaminated soils at or near the surface, and prevent the migration of hazardous materials resulting from the exceptionally heavy winter rains. Once the IRM has been completed, a remedial investigation will be undertaken to determine if the ground water or soil remain a source of contaminatin at the site. The objectives for the IRM are as follows:

A. Remove Potential for Direct Contact -

The site contains exposed concentrated ore piles, open ore bins, contaminated soils and partially filled extraction vats. The State of California in a March 10, 1983, memorandum (prepared by DOHS' Environmental Toxics Epidemiology Unit, Epidemiological Study Section), found that the abandoned wastes remaining on site pose a potential health threat to people using the adjacent road (a prime fishing access road for the Tribe), and people accessing the site (children have been frequently observed playing at the site). Exposure can occur by direct skin or eye contact, inhalation of dust during the dry season, and from ingestion. It is the intent of the IRM to remove these materials from direct access to the public.

B. Prevent Migration to the Trinity River and Adjacent Fields -

In addition to the ore piles, open ore bins, contaminated soils, and partially filled extraction vats, the recommended IRM will address the field and the adjacent ditch. Contamination in these areas is evident by the lack of vegetation and observed tailings that have migrated from the piles to the ditch and field. These areas have collected surface runoff directly from the process plant area during the rainy season and are considered to be a continuing source of contamination to the river and the adjacent farm.

This surface runoff ponds in the field and the ditch prior to its discharge to the Trinity River during periods of extended rainfall. This standing water is accessible to grazing animals in the adjacent pasture. These animals could ingest contaminated flora or drink contaminated water and thus accumulate toxic metals in their tissues. Human exposure could occur from ingestion of the contaminated animal products.

The surface runoff associated with the ditch could transport on-site wastes to the Trinity River where they may present a threat to the aquatic environment of the river and bioaccumulate in the sport fish in the area. Human exposure would occur as a result of ingestion of the contaminated fish.

C. Provide Controls Which will be Consistant with Future Remedial Actions -

At this time, our knowledge concerning the extent of the contamination in the soil and ground water is limited. The recommended IRM will not preclude additional sampling of the site nor will it limit the EPA's options for permanent remedy at the site. Equally important, it will not require additional remedial action if the remainder of the site does not warrent additional acition. The recommended IRM is the simplest, cleanest method of addressing the immediate runoff problem at the site in a manner which does not limit options for future action at the site.

III. EXISTING SAMPLING DATA

Immediately after beginning the study, existing data and information contained in the files of the California State Department of Health Services, EPA Region 9, Indian Health Service, and Tribal records on the Hoopa Valley Indian Reservation were obtained. These data were reviewed to determine the nature and extent of contamination on the site and to help recommend an IRM to meet the objectives stated above.

The most extensive sampling on the site was done by the DOHS in January 1983. Samples were taken from the tailings piles and two ore bins located in the processing plant area. Several samples were also taken from areas west of the process plant area where there was evidence indicating migration of the contaminants. These areas included the access road, ditch, and low

area of the adjacent field. A few samples were also taken west of the low area of the field.

Preliminary sampling was done on July 23, 1981, and February 2, 1982. The 1981 sampling was done during an inventory of potential hazardous waste sites. Representatives from DOHS, Humboldt County Health Department, and the Indian Health Service were present during the sampling. Locations of these samples are described as: vat, low point of small pond, ditch, and ore loader. The results are included in a report titled "Field Investigations of Uncontrolled Hazardous Wastes Sites, FIT Project, Sampling Documentation Report, Hoopa Valley Sites, Hoopa, California," February 2-3, 1983, by Ecology and Environment.

The February 2, 1982, sampling done as part of the report mentioned above was intended primarily to provide sufficient information to apply EPA's Hazard Ranking System to the site. These samples were taken in one of the ore bins, one of the vats, and in the ditch.

In addition to the sampling data of Janauary 23, 1983, a representative of the Indian Health Services was present and took direct pH readings of leachate ponded on the access road adjacent to the field. The lowest reading was from the tailings pile. A pH value of less than 0.4 was obtained from a sample taken along the road both north and south of the location of the lowest reading. Values of pH increased as readings were taken in both directions.

IV. RATIONALE FOR CLEANUP

The most acute problem found at the site is the extremely acidic nature of the runoff from the tailings piles. The leachate which is ponding on the surface of the site, road and ditch has a reported pH of 0.4 to 2.2. The pH is depressed by the sulfuric acid coming from the piles. Solutions with a pH below 2.0 are corrosive to the skin and eye tissues and, therefore, hazardous to the public. Solutions with a pH less than 1.0 will cause permanent damage if splashed onto human skin or into eyes.

Because the leachate from the piles is ponding on a heavily traveled road, it is not possible to prevent public access by fencing. It is reasonable to assume that the local residents and children may come in contact with the leachate and be burned as a result of that contact.

The tailings piles and road also contain high concentrations of heavy metals (cadmium, copper and zinc), posing a significant threat to the public health, if the material is ingested, and to the environment, if it runs off into the Trinity River.

In addition to the tailings pile and the road, DOHS and Region 9 recommend removing surface soils in the low area of the field and along the ditch to prevent additional runoff of material contaminated by the piles to the Trinity River. The cost to remove this material is significantly less than the cost to investigate the environmental damage caused by leaving it in place and conduct a second remedial action next year.

V. VOLUME OF CONTAMINATED MATERIALS

Volumes of contaminated materials were estimated for each of the following areas:

° TAILINGS PILE

Based on field cross sections, the tailings pile consists of 530 cubic yards of material. The piles were assumed to be sitting on level ground.

° ORE BINS

Based on the dimensions of the bins and estimated average depth of material in each bin, the two ore bins are estimated to hold 260 cubic yards of material.

° VATS

DOHS and Region 9 estimated that the three vats hold a total of 75 cubic yards of material.

° ACCESS ROAD

It is estimated that 100 cubic yards of material will need to be removed from the access road. This is based on scraping 6 inches off the road beginning near its intersection with the ore haul road and ending near the north end of the contaminated area of the field.

° DITCH

Fifty cubic yards will be removed from the ditch by scraping 6 inches of material off the bottom and sides. This would extend along the ditch, adjacent to the contaminated portion of the field.

° FIELD

Assuming that six inches of material will be removed from the contaminated area of the field an estimated 335 cubic yards of material would be removed. This would include the area of the field where there is no vegetation growing.

° TOTAL VOLUME

Based on presently available information, the selected IRM will remove a total estimated volume of 1,350 cubic yards of contaminated material.

VI. DEVELOPMENT OF POTENTIAL ALTERNATIVES

During the development of potential alternatives, mining companies in California, Nevada, and Arizona were contacted to determine their interest in the material remaining on the Celtor site. This research did not identify any company interested in the "mine tailings," which have the highest concentrations of zinc and copper of the material remaining on the site.

There was also some consideration given to trying to locate a mine tailings disposal area that was "controlled" and had capacity available for disposal of the material from the Celtor site. This type of alternative would be attractive from a cost-effectiveness standpoint if the facility were located in the vicinity of the site. However, the mining company contacted had its own waste discharge problems and was not receptive to the idea of taking on more waste. This type of alternative would also present legal problems if the site of disposal were to become a future source of contamination. This alternative was therefore dropped from further consideration.

The first step in developing potential IRM alternatives was to identify potential remedial technologies for dealing with contaminated soils. The following remedial technologies were considered:

- Incineration
- Wet air oxidation
- Solution mining
- Microbiological degradation
- Encapsulation
- Neutralization
- Solidification
- Excavation and disposal

Several factors used in screening the alternatives were:

- Technical Feasibility
- Cost effectiveness
- Environmental effectiveness
- Implementation timeframe
- Compatibility with future actions

VII. INITIAL SCREENING

The first step in screening alternatives was to limit the above general technologies to those appropriate for soils contaminated with heavy metals. This eliminated incineration, microbiological degradation, and wet air oxidation as potential technologies for use in IRM alternatives. These alternatives are not applicable to inorganics such as heavy metals.

The second step eliminated in situ treatment such as neutralization, solidification, and solution mining. Neutralization and solidification alternatives would not ensure isolation of contaminated soils unless the soils were encapsulated. Therefore, these are considered with the encapsulation alternatives discussed in following sections. Solution mining also cannot be considered without geologic and groundwater data which is not available. Therefore, solution mining was dropped from further consideration.

NO-ACTION ALTERNATIVE

Under the no action alternative, all hazardous wastes would be left onsite in their present state. The significant health threats existing on the site would remain under the no action alternative. These include the health effects associated with ingesting material with high concentrations

of cadmium, and direct contact with acid solutions leaching from the tailings that remain on the site.

Because of the potential health threat resulting from the no-action alternative, it was dropped from further consideration.

Evaluation of Screened Alternatives

The remaining viable alternative consisted of two general categories, on-site encapsulation and removal to off-site disposal.

Four on-site encapsulation alternatives were considered. Three consisted of a landfill type of encapsulation; two of these three included technologies that treat the contaminated soil before isolating them within the liner. Such treatment would add to the reliability of the landfill encapsulation alternative. The fourth encapsulation alternative consisted of constructing a concrete vault for isolating the contaminated soils.

The off-site alternative consisted of hauling the contaminated soils to the nearest Class 1 landfill in the San Francisco Bay Area.

VIII. DESCRIPTION OF THE ALTERNATIVES

Each of the five IRM alternatives was developed in enough detail to define major issues and concerns related to each alternative. A description of assumptions used in developing each alternative is provided in the following sections.

Each of the following alternatives includes either isolating or removing the total volume of contaminated material as described above in this report. All of the alternatives also include replacing the contaminated soil from the field with suitable imported topsoil and seeding.

Landfill Encapsulation

The three landfill encapsulation alternatives are based on the same assumptions and differ only in that two of them involve incorporating additives into the contaminated material (lime for neutralization and cement for solidification). Each landfill encapsulation alternative consists of a double liner surrounding the contaminated material, isolating it from uncontaminated soils, and a leachate collection system. It was assumed that the top would consist of a PVC liner and an 18-inch-thick layer of clay or silt mixed with bentonite. Six inches of topsoil covering the top liner would be seeded to produce vegetation. The bottom liners would be seperated by 12 inches of gravel and slotted PVC pipe which would lead to a leachate collection system. The leachate collection system would be periodically monitored to determine if the first liner is leaking.

It was assumed that the ore haul road and approximately 1-1/2 feet of soil (assumed uncontaminated) would be excavated beneath the tailing pile. The contaminated material would be encapsulated up against the remaining slope where the ore haul road was excavated. A portion of the material excavated from the ore haul road was assumed to be suitable for backfilling the river access road. It was assumed that the excess material would be

disposed of in the r.. .ne to the south and that the soil excavated from the field would be replaced with suitable topsoil.

Concrete Vault Encapsulation

The concrete vault alternative consists of a cylindrical shaped vault 20 feet high and 50 feet in diameter. A concrete slab would be set on an area excavated approximately 5 feet deep. The slab would be set on a 12-inch-thick gravel drain with perforated PVC pipes and PVC liner below to collect leachate in the event of failure. The vault would also be lined with a PVC liner.

The vault would be placed where the tailings pile is presently located. The existing concrete structures would be left onsite.

For the vault alternative, it was assumed that imported fill would be required to replace contaminated soils below the ground surface to ensure proper site drainage.

All onsite encapsulation alternatives included fencing the encapsulation area and hydroseeding areas (other than roads) where fill material was imported. These alternatives also included a leachate collection system which could be monitored.

Removal to a Class I Landfill

The alternative for excavating the contaminated soils and disposing of them at a Class I landfill was developed for the same material as for the onsite alternatives. However, in computing the total volume to be hauled, a swell factor of approximately 15 percent was used for some of the contaminated soils. This was to account for the increase in volume of excavated material relative to this same volume of material when it is compacted in place. No swell factor was used for the mine tailings and soils on the site that are not compacted. This resulted in a volume of 1,420 cubic yards to be removed.

For the removal alternative, we assumed the contaminated material would be removed and hauled to a Class I landfill approximately 360 miles from the site. This is the closest approved landfill that could accept the waste from the site. It was assumed that imported fill material would replace the material excavated from the field, ditch, and access road.

The area where contaminated material is removed will be seeded.

IX. COSTS

The following cost estimates are intended for the comparison of the alternatives. The final cost of the selected IRM alternative will depend on actal labor and material costs, competitive market conditions, project scope, implementation schedule, and other variable factors.

It was assumed that the health and safety plan for the site requires a Level C protection. This will require construction workers to wear protective clothing and respirators during construction activities on site. Wearing this

protective gear normally reduces efficiency of construction activities. This reduction in efficiency and its effects on construction costs were estimated and accounted for in these cost estimates.

All costs are at July 1983 price levels. Interest during construction and price escalation are not included in this analysis. Three items were estimated based on percent of direct construction costs. These include health and safety requirements at 5 percent, mobilization and temporary facilities at 10 percent, and bonds and insurance at 2 percent.

Contingencies were added to each alternative cost estimate to provide for many minor items not addressed prior to final design and for unforeseen circumstances. A value of 10 to 30 percent of the direct costs is typical depending on how confident the estimator is of the design criteria and information upon which the estimate is based. A 30-percent contingency was used for all costs for each alternative except for the hauling and disposal costs fo the removal alternative. A 15-percent contingency was used for thetwo direct costs because they were based on telephone quotes from experienced hazardous waste haulers in Northern California.

Assuming the selected IRM will be implemented this year, the earliest construction could begin is in early October, and it would extend into the month of November, the beginning of the rainy season in Hoopa. Therefore, effects of rain on construction costs were considered for all alternatives.

Operation and maintenence (O&M) costs include an annual allowance in constant 1983 dollars for encapsulation alternatives to account for maintaining the fence, cap (landfill alternative only), warning signs, ditches and culverts for diverting surface runoff. These costs are based on assuming the encapsulation would be a permaent remedy. The total annual O&M costs for onsite alternatives are estimated to be $2,000, assuming a period of 50 years. It was assumed that there would be no O&M costs for the removal alternative.

The following table is a summary of the design and construction, annual operation and maintenance costs for each alternative.

	Alternative	Design and Construction	Present Worth Operation and Maintenance
1.	Off-site Removal	$340,000	
2.	Encapsulation		
	a. Liner only	$254,000	$20,000
	b. Liner and Neutralize	$265,000	$20,000
	c. Liner and Solidify	$296,000	$20,000
3.	Concrete Vault	$320,000	$20,000

X. COMMUNITY INVOLVEMENT

At a public meeting held on August 29, 1983, the IRM Feasibility Study was presented to public at the Hoopa Valley Business Council offices for their review and comment. The overwhelming concensus from the public was that they support the recommendation of off-site removal of the contaminated materials at the Celtor Chemical Works site to the nearest Class I disposal facility.

XI. RECOMMENDED ACTION

Section 300.68(j) of the National Contingency Plan (NCP) [47 FR 31180, July 16, 1983] states that the appropriate extent of remedy shall be determined by the lead agency's selection of the remedial alternative which the agency determines is cost-effective (i.e., the lowest cost alternative that is technologically feasible and reliable) and which effectively mitigates and minimizes damage to and provides adequate protection of public health, welfare, or the environment. Based on our evaluation of the cost-effectiveness of each of the proposed alternatives, the comments received from the public, and information received from the State, we recommend the excavation, transport and off-site disposal of hazardous substances as the Initial remedial action.

Our analysis revealed that off-site removal was the lowest cost alternative that effectively mitigated the public health, welfare and environmental impacts and satisfied Region 9's objectives for site cleanup for the reasons that follow:

° Level of Cleanup

Removal was rated the highest because the contaminated material is to be completely removed from the site. On-site encapsulation only isolates the material and is less favorable.

° Implementation Timeframe

Based on estimated construction schedules for each alternative, the removal alternative was rated the highest because it had the shortest construction period, and therefore less chance of a delay because of the historic heavy winter rainfall at Hoopa.

° Environmental Effectiveness

The removal alternative was rated the highest because after remova the land is acceptable for any use. The removal alternative also eliminates the community's concern by removing the contaminated material.

° Technical Feasibility

Excavation hauling of contaminated materials are very simple and proven construction activities and therefore were rated the highest of the alternatives. Encapsulation alternatives are more technologically complex and require more care during construction, especially in installing the plastic liners to ensure that the liners are not damaged during construction There is also no risk of failure after waste removal, whereas leaks in PVC liners are not uncommon.

° Compatability With Future Actions

Encapsulation compatable with future remedial actions because the encapsulated area would need to be undone to perform additional sampling or any other remedial activity at the site.

° Public Comment

The public received in support of off-site disposal further justifies the expenditure of funds for removal of 1340 cubic yards of contaminated material. Also, the additional expenditure provides a much more reliable cleanup and eliminates the potential to further contaminate the area around the site.

XII. STATE INPUT

After giving consideration to the cost-effectiveness of each alternative and evaluation of the public comments, the California State Department Of Health Services recommends excavation, transport and off-site disposal of hazardous substances. A letter confirming the State's concurrence with this recommendation is attached.

XIII. PROPOSED ACTION

We request your approval of the off-site disposal Initial Remedial Measure. Our schedule calls for construction to proceed by October 17, 1983, and completion of the IRM by November 14, 1983.